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(56) Documents Cited

GB 2214417 A GB 2056620 A US 4663798 A

(58) Field of Search

UK CL (Edition M ) A4F, F2U

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(54) Mop wringers

(57) The mechanism for a mop wringer includes a toothed gear element 15 mounted on a shaft 13, which engages a toothed rack 16 mounted for reciprocating longitudinal movement to operate the mop wringing mechanism mounted within the frame, the toothed gear element being formed mainly from synthetic plastics material and having a metal reinforcing element 26 formed with a non-circular aperture which fits over a corresponding non-circular portion of the aforesaid rotatable shaft. The use of the metal element 26 reduces the tendency to failure under the torque applied by operation of the handle 14.

FIG 2

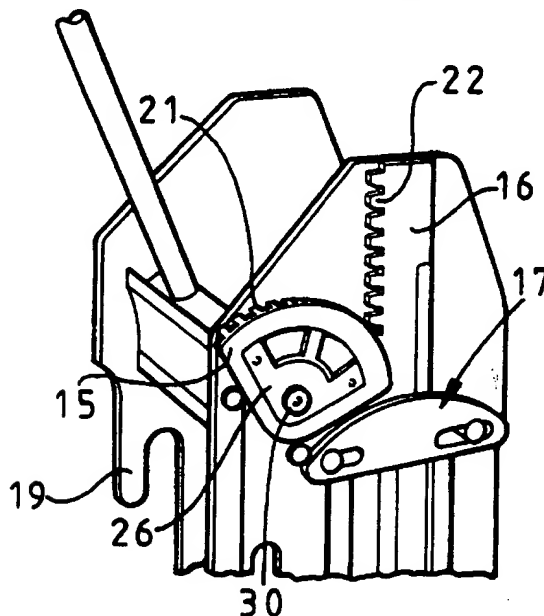
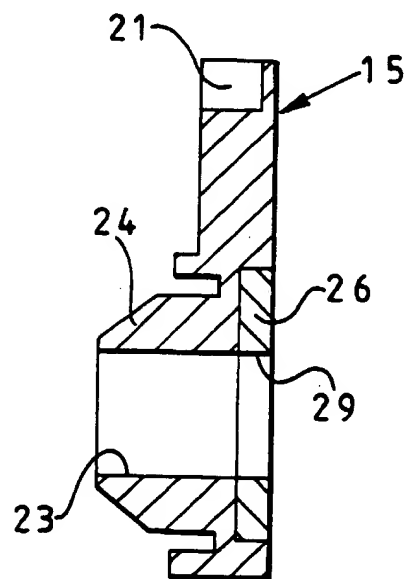


FIG 4



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

FIG 1

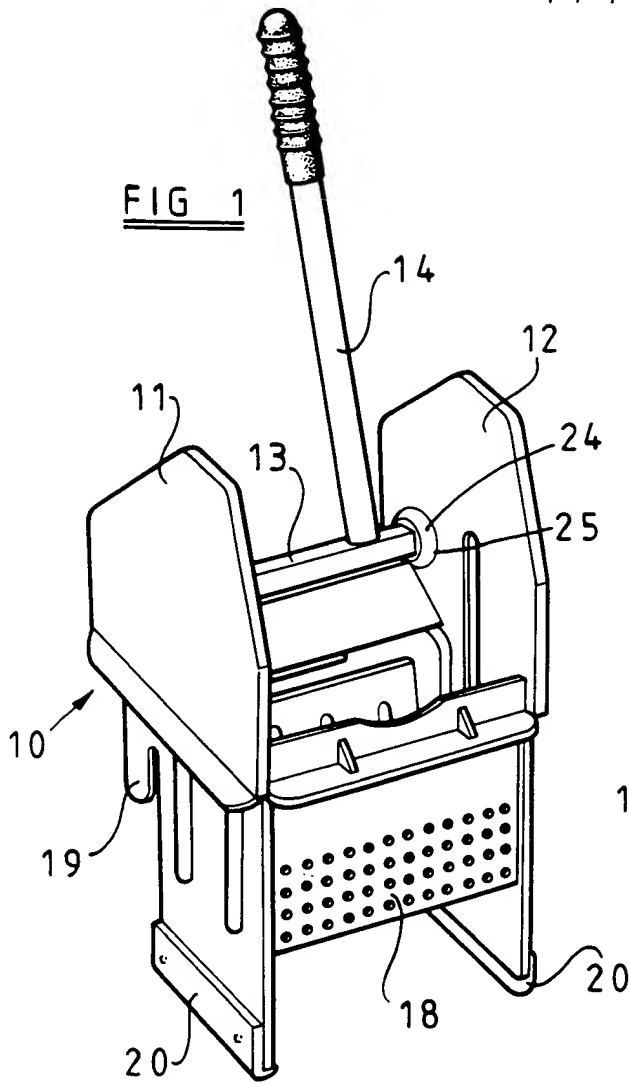


FIG 2

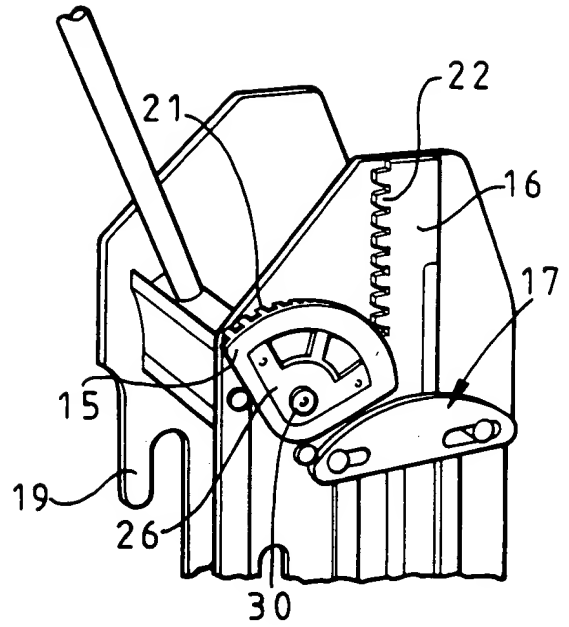


FIG 3

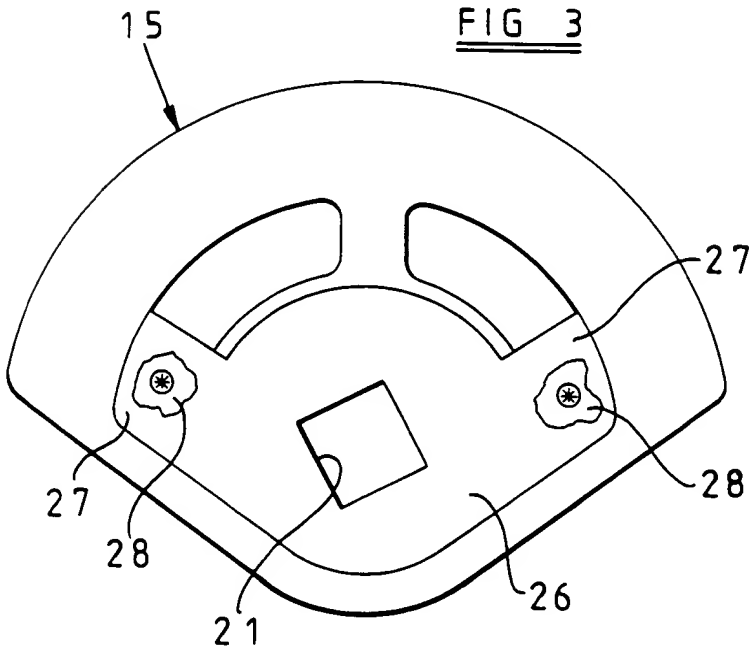
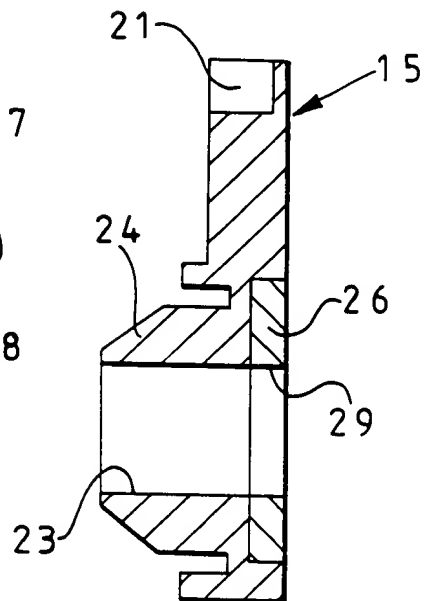


FIG 4



"Improvements in or relating to Mop Wringers"

The invention relates to mop wringers of the kind comprising a supporting frame, a shaft rotatably mounted on the frame and having secured thereto an elongate operating lever handle extending generally at right angles to the shaft, a toothed gear element mounted on the shaft so as to rotate therewith, the toothed element being in operative driving engagement with a toothed rack mounted for reciprocating longitudinal movement on the frame to operate a mop wringing mechanism which is mounted within the frame.

Normally the rotatable shaft is horizontal, the toothed gear element being mounted on the one end of the shaft and engaging a vertically reciprocable toothed rack. The toothed gear element is usually quadrant-shaped.

Hitherto, in mop wringers of this kind the toothed gear element has either been formed from metal or from synthetic plastics material. Metal elements are strong and may be firmly mounted on the rotatable shaft, but they are noisy in use and expensive. Plastics gear elements have therefore been preferred since they are quieter in operation and cheaper to manufacture. However they are not as strong as metal gear elements, and may have a tendency to fail under the continued application of the considerable force that can be applied through the operating lever handle.

Further more, we have recently successfully

developed ergonomic wringers (British Patent Specification No. 2243537) where the structure of the frame, its method of support, and the use of an operating handle of increased length has resulted in  
5 much more efficient wringing of the mop due to the increased amount of pressure that it is possible to apply to it. Such ergonomic wringers have been very successful, but one result of the more powerful and effective operation is that even greater torque pressure  
10 may be put on the toothed gear element, and particularly on the junction between the element and the rotatable shaft.

The toothed gear element is normally formed with a non-circular aperture, usually square, which fits  
15 over a correspondingly shaped section on the rotatable shaft. Attempts have been made to increase the strength of the plastics gear element by using stronger plastics materials such as reinforced glass-filled nylon material, since ordinary plastics material tended to  
20 fail by breaking or cracking of the gear element. The use of a stronger plastics reduced the incidence of this sort of failure but very high torque forces then tended to cause the square section on the rotatable shaft to gouge out the square hole in the toothed gear element,  
25 eventually rendering the wringer inoperable. In an endeavour to overcome this problem, gear elements have been employed where the portion of the element formed with the square aperture was extended or bulged to one

side of the element so as to increase the bearing length of the rotatable shaft which was engaged within the gear element. This improved matters but was still not sufficient to withstand very rigorous usage.

5 The present invention provides an improved arrangement to overcome the disadvantages of the prior art constructions.

According to the invention there is provided a mop wringer comprising a supporting frame, a shaft  
10 rotatably mounted on the frame and having secured thereto an elongate operating lever handle extending generally at right angles to the shaft, a toothed gear element mounted on the shaft to rotate therewith, which element is in operative driving engagement with a  
15 toothed rack mounted for reciprocating longitudinal movement on the frame to operate a mop wringing mechanism mounted within the frame, the toothed gear element being formed mainly from synthetic plastics material and having a metal reinforcing element formed  
20 with a non-circular aperture which fits over a corresponding non-circular portion of the aforesaid rotatable shaft.

The arrangement according to the invention thus provides strong metal-to-metal contact between the  
25 gear element and the shaft while allowing the rest of the gear element to be formed from plastics material and thus maintaining the advantages of cheapness and quiet operation referred to earlier.

The toothed gear element is preferably generally sector-shaped, having an arcuate portion, formed with teeth, which is concentric with the axis of rotation of the shaft. For example the element may be  
5 generally quadrant-shaped.

The metal reinforcing element may comprise a metal plate which is riveted, bolted or otherwise secured to the plastics material of the rest of the toothed element. The metal plate is preferably at  
10 least partly embedded in one surface of the plastics.

The non-circular aperture in the reinforcing element may be square and engage a square-section part of the rotatable shaft. The rotatable shaft may be of the same non-circular section along substantially the  
15 whole of its length.

The toothed gear element is preferably also integrally formed with a central boss having an axial passage which forms a continuation of the aperture in the reinforcing element, the boss projecting laterally  
20 from one side of the toothed gear to extend the bearing length of said passage.

The following is a more detailed description of an embodiment of the invention, by way of example, reference being made to the accompanying drawings in  
25 which:

Figure 1 is a general perspective view of a typical mop wringer according to the invention,

Figure 2 is a detailed view of one side of the

wringer showing the toothed gear element and rack,

Figure 3 is an enlarged view of the toothed gear element alone, and

Figure 4 is a section through the toothed gear  
5 element.

Referring to Figures 1 and 2: the mop wringer comprises a metal frame 10 having spaced parallel upper side panels 11 and 12 between which extends a rotatable shaft or drive bar 13 of square cross section. An  
10 elongate operating handle 14 is welded at one end to the drive bar 13 and extends at right angles to it so that the drive bar may be rotated by swinging the handle 14.

One end of the drive bar 13 is rotatable in a bearing (not shown) in the side panel 11 while the  
15 opposite end of the drive bar 13 has mounted thereon a toothed quadrant 15, see Figure 2. The toothed quadrant 15 serves both to mount the end of the drive bar 13 rotatably in the side panel 12 and also to transmit rotation of the drive bar 13 to a plastics toothed rack  
20 16 which is mounted for vertical reciprocating movement on the outer side of the side panel 12 as shown in Figure 2.

The vertical downward movement of the toothed rack 16 is arranged to operate, through a transmission  
25 17, a wringing mechanism (not shown) located within a perforated lower portion 18 of the frame 10. The precise nature of the wringing mechanism does not form a part of the present invention and will not therefore be

described in detail. Suffice it to say that such wringing mechanisms are well known and comprise elements which, as the toothed rack 16 is moved downwardly, squeeze between them a mop which has been lowered into  
5 the wringer so as to press water from the mop. The water then flows downwardly through the perforations in the lower part of the wringer into the bucket or other container on which the wringer is mounted.

The wringer may have a hooked rear portion 19  
10 which fits over the rear wall of a bucket, and foot portions 20 which bear on supporting structures provided on the bucket to support the substantial forces which can be applied to the wringer through the long operating handle 14. For example, the foot portions 20 of the  
15 wringer may be supported on internal ledges integrally formed on the inner walls of the bucket. A very effective form of wringer of this type is described in our British Patent Specification No. 2243537, but it is to be understood that the present invention is not  
20 limited to use with such wringers and may be employed with any wringer of the general type first referred to above.

The quadrant 15 is mainly injection moulded from plastics material, such as glass-filled nylon, and  
25 is formed around the arcuate portion of its periphery with teeth 21 which are in driving engagement with the teeth 22 on the toothed rack 16. The quadrant is formed with a square section axial passage 23 (see Figure 4)



which fits closely over the square section drive bar 13. As best seen in Figures 1 and 4 the inner side of the quadrant 15 is formed with an inwardly projecting boss or bulge 24. This projects through and closely fits a  
5 circular aperture 25 in the side panel 12 of the frame so as to provide the bearing for the end of the drive bar 13.

The plastics quadrant 15 is reinforced, around the aperture 23, by a shaped metal plate 26, for example  
10 of steel, which is partly embedded in the surface of the quadrant 15 so that the outer surface of the plate is substantially flush with the outer surface of the quadrant, as shown in Figure 4. The plate 26 is formed with ears 27 which are secured to the quadrant by  
15 rivets 28 although bolts or any other suitable securing means may be employed. The plate 26 is formed with a square aperture 29 which registers with the square passage 23 in the quadrant 15 and fits closely over the corresponding square section of the drive bar 13. A  
20 retaining element 30 secures the quadrant to the end of the drive bar 13.

Thus, as the operating handle 14 is swung clockwise, as seen in Figure 2, the quadrant 15 is rotated clockwise and drives the toothed rack 16  
25 vertically downwards to operate the wringing mechanism to squeeze out the mop which has been previously introduced into the wringer. As previously mentioned, the long operating handle 14, and the robust structure

and mounting of the wringer, enables very high pressures to be imparted to the mop through the mechanism, to result in very efficient wringing out of the mop, and the reinforcement of the connection between the quadrant  
5 and the drive bar 13, by the metal plate 26, enables the transmission to sustain the high torque resulting from the forces involved.

CLAIMS

1. A mop wringer comprising a supporting frame, a shaft rotatably mounted on the frame and having secured thereto an elongate operating handle extending generally at right angles to the shaft, a toothed gear element mounted on the shaft to rotate therewith, which element is in operative driving engagement with a toothed rack mounted for reciprocating longitudinal movement on the frame to operate a mop wringing mechanism mounted within the frame, the toothed gear element being formed mainly from synthetic plastics material and having a metal reinforcing element formed with a non-circular aperture which fits over a corresponding non-circular portion of the aforesaid rotatable shaft.

2. A mop wringer as claimed in claim 1, wherein the toothed gear element is generally sector-shaped, having an arcuate portion, formed with teeth, which is concentric with the axis of rotation of the shaft.

3. A mop wringer as claimed in claim 1 or claim 2, wherein the metal reinforcing element comprises a metal plate secured to the plastics material of the rest of the toothed element.

4. A mop wringer as claimed in claim 3, wherein the metal plate is at least partly embedded in one

surface of the plastics material.

5. A mop wringer as claimed in any one of the preceding claims, wherein the non-circular aperture in  
5 the reinforcing element is square and engages a square-section part of the rotatable shaft.

6. A mop wringer as claimed in any one of the preceding claims, wherein the rotatable shaft is of the  
10 same non-circular section along substantially the whole of its length.

7. A mop wringer as claimed in any one of the preceding claims, wherein the toothed gear element is  
15 also integrally formed with a central boss having an axial passage which forms a continuation of the aperture in the reinforcing element, the boss projecting laterally from one side of the toothed gear to extend the bearing length of said passage.

20

8. A mop wringer substantially as hereinbefore described with reference to the accompanying drawings.

**Relevant Technical Fields**

- (i) UK Cl (Ed.M) A4F; F2U  
(ii) Int Cl (Ed.5) A47L 13/59, 13/60

Search Examiner  
A C HOWARD

Date of completion of Search  
4 JANUARY 1994

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-  
1-7

**Categories of documents**

- X: Document indicating lack of novelty or of inventive step. P: Document published on or after the declared priority date but before the filing date of the present application.  
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.  
A: Document indicating technological background and/or state of the art. &: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2214417 A (HOME HYGIENE) See Figure 3	1, 2, 3, 5
Y	GB 2056620 A (KUNZ) See page 2 lines 20-59	1, 2, 3, 5
Y	US 4663798 (SACKS ET AL) See Figure 2 and column 5 lines 51-61	1, 2, 3, 5